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Duane Arnold Energy Center
Operated by Nuclear Management Company, LLC

January 26, 2004

NG-04-0044
10 CFR 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Duane Arnold Energy Center
Docket 50-331
License No: DPR-49

Licensee Event Report #2003-006-00

Please find attached the subject Licensee Event Report (LER) submitted in accordance with 10 CFR 50.73. There are no new commitments contained within this report. Should you have any questions regarding this report, please contact this office.

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NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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TITLE (4)

Unplanned Manual Reactor Scram due to Degrading Condenser Vacuum

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	25	2003	2003	- 006 -	00	01	26	2004	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	20

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	X 50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Robert Murrell, Regulatory Affairs	319-851-7900

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 25, 2003, while operating at approximately 20% power, a manual reactor scram was inserted due to degrading condenser vacuum. The plant was operating at reduced power to perform testing to determine a source of excessive air in-leakage. The manual reactor scram was inserted in anticipation of an automatic trip. All plant systems responded as expected to this event including Primary Containment Isolation System groups 2, 3, and 4, which isolated due to reactor water level dropping below 170". The reactor water level drop is expected following a scram from power due to void collapse in the reactor vessel. Reactor water level was restored to normal and the group isolations were reset.

Extensive testing and evaluations were conducted and determined the cause of the degrading condenser vacuum was from excessive air in-leakage from a failed welded seam between the High Pressure Condenser and the crossover loop seal. The seam was repaired and a plant startup was commenced on December 4, 2003.

There were no actual safety consequences associated with this event. There was no effect on public health and safety as a result of this event. This event is reportable under 10CFR50.73(a)(2)(iv)(A).

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

I. Description of Event:

On November 25, 2003, at about 1515, while operating at approximately 20% power, main condenser vacuum began degrading. Power was being held at 20% power so that helium testing could occur with plant systems in normal operation, yet at a low enough power level to minimize potential effects of a loss of condenser vacuum. Additionally, testing at this lower power level minimized dose accumulated during the testing. As a result of the degrading vacuum, operators entered Abnormal Operating Procedure (AOP) 691, "Condenser High Backpressure" and attempted to lower reactor power in order to avoid a main turbine trip. Vacuum continued to degrade to a point that a manual reactor scram was required. A manual reactor scram was inserted at about 1522, on November 25, 2003. All plant systems responded as expected to this event including Primary Containment Isolation System groups 2, 3, and 4, which isolated due to reactor water level dropping below 170". The reactor water level drop is expected following a scram from power due to void collapse in the reactor vessel. Reactor water level was restored to normal and the group isolations were reset.

In the weeks prior to the reactor scram, the site had been investigating abnormally high main condenser air in-leakage. The cause of the degrading condenser vacuum was from this excessive air in-leakage. After extensive testing and investigation, the cause of the excessive air in-leakage was determined to be from a failed welded seam in the high-pressure condenser at the top of the loop seal.

II. Cause of Event:

The root cause for the manual reactor scram on degraded condenser in-leakage was a failed seam weld between the condenser loop seal top plate and the condenser shell. The seam weld failed because it was inadequate to provide structural support and long-term sealing. The weld was examined extensively in an attempt to determine the cause of its failure. A representative from the condenser manufacturer aided NMC in this investigation. NMC personnel, and the vendor representative concluded that the weld had originally been installed incorrectly. The original design drawing required a full penetration weld, however, only a fillet weld had been installed.

Inspection of the actual weld indicated additional contributors to the welded seam failure in that some of the weld material showed evidence of erosion. This erosion was caused by exposure to high-energy steam from the discharge of main steam line bypass valve number one and the discharge from the last stage of the low-pressure turbine. The combination of weld material erosion and the flexing of the two plates resulted in the failure of the welded seam.

III. Assessment of Safety Consequences:

The condenser performs the function of collecting steam from the low-pressure turbines, condensing this steam into water by removing energy, and providing a supply of water to the condensate pumps. It also provides a volume to collect bypass steam from the main steam system during start-ups, shut downs, and turbine trips. Additionally, under certain accident conditions, it provides a volume to collect leakage through the Main Steam Isolation Valves

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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

(MSIV). The identified leak from the seam weld would not have prevented the function to collect MSIV leakage, because the condenser is either at a slight negative pressure or atmospheric at the time the function would be necessary. The total volume available and the relative low pressure combine to assure that little or no main steam line leakage would escape from the condenser. Additionally, the condenser remained available for heat removal throughout the event.

This event did not affect the availability of other systems needed to maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident.

Therefore, there were no actual safety consequences associated with this event. There was no effect on public health and safety as a result of this event.

IV. Corrective Actions:

The failed weld, and its companion weld in the low-pressure condenser, were both ground out and full penetration welds were installed in their places.

Other welds on the sides and bottom of the loop seal were evaluated and determined to be acceptable as-is.

Appropriate periodic condenser inspection plans, including welds and interior surfaces in the vicinity of high-energy steam flow, are being evaluated. CAP 30391 is tracking this action.

Additional focused inspections of both condensers during the next refuel outage (RFO 19) to inspect selected shell seam welds and other areas are being evaluated. CA 36995 is tracking this action.

V. Additional Information:

Previous Similar Occurrences:

A review of LERs at the DAEC over the last 3 years identified no LERs with similar causes.

EIIS System and Component Codes:

Condenser System: SG

Reporting Requirements:

A 10CFR50.72(b)(3)(iv) notification was made on November 25, 2003, and is listed as event number EN 40353. This report is being submitted pursuant to 10CFR50.73(a)(2)(iv)(A).